

URBAN RAT SURVEYS

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INTRODUCTION

The exterior urban rat survey provides information on rat infestations and the housing and premises sanitation deficiencies favoring rat populations. It fulfills a basic requirement in every rat control program, the need for knowledge of conditions in the community served by the program. The necessity for a rat control program and the directions it must take are determined from survey results. The survey and subsequent periodic resurveys also provide the bases for later evaluation of program progress. Surveys also contribute detailed information for use in television and radio programs, newspaper articles, brochures, posters, exhibits, and personal contacts, to inform the public of community environmental problems and developments.

There are three distinct phases in an urban rat survey: (1) inspection of residential areas to record rat infestations and other environmental deficiencies; (2) preparation of maps, graphs, and tables to summarize results; and (3) preparation of a report that gives an analysis of the deficiencies found in the urban environment, together with recommendations for improvement.

This guide is for classroom use and for the field training of inspectors who serve in community rodent-control programs. It also serves as a reference on survey techniques and the preparation of reports and maps. However, an urban rat survey is not an end in itself, and should not be undertaken unless the findings will be used to meet the needs of a community.

CHARACTERISTICS OF URBAN RAT SURVEYS

The survey is the data-gather phase of program planning. It is also an opportunity to tell the public about the program through contacts made while the survey teams inspect the premises. An analysis of survey results will show the extent and severity of rat infestations and causative conditions and delineate the program needs, as well as the progress made since a previous survey. Personnel, material, and equipment requirements for a comprehensive rat control program can be determined from base data obtained by the survey. Survey procedures and forms must be standardized in order to obtain valid information which can be used for evaluative purposes as well as for planning.

The urban rat survey involves an *exterior* inspection of premises to record significant data such as rat signs, the presence of rat entries to homes, and the incidence of environmental deficiencies that provide food and harborage to rats. Although the Norway rat (the primary domestic rodent) is essentially a burrowing animal that lives out-of-doors, it will enter homes if openings exist and the odors of food attract it. Whenever the rats find suitable food, water and harborage, they become established and reproduce rapidly. Interior inspections may be made during the operational phase of a rat control program after the exterior infestation has been delimited, and the target areas established.

Only two forms are required for an urban rat survey, a block record for use during the field inspection, and a summary form for tabulations made in the office. The forms, "Block Record - Exterior Sanitation and Rat Survey", and "Summary - Exterior Sanitation and Rat Survey" are discussed in this handbook. These forms may be modified to serve the precise needs of local programs, but *it is essential that blocks and premises be used as units for reporting.*

Although simple check marks on the forms suffice to indicate the presence of deficiencies on premises, some programs use a code to record more detailed information. Such a code is furnished in this handbook as an alternative to the check system. The two survey forms will provide sufficient data for planning and conducting the various functions of a community rodent-control and environmental improvement program, including rat killing, improvements in housing, refuse handling, maintenance of vacant lots, elimination of dilapidated outbuildings and the removal of junk automobiles and appliances, as well as other necessary local improvements.

BASIC UNITS IN THE OPERATIONAL PROGRAM

For planning, operating, and reporting purposes, all rat control programs use basic geographic units, such as the following:

1. **Premises** - for recording existing conditions. A premises may consist of an individual residence and its surroundings, whether a row house or a detached home. A duplex house or a large apartment building and its surroundings is considered as a premises, as it is usually under

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one ownership and situated on one plot of land. The same criteria apply to a business premises with a major building and other structures. In the case of larger aggregations, such as several apartment buildings under one ownership or several ownerships, each major numbered building and its surroundings comprise a separate premises.

2. **Block** — for classifying conditions. A block is ordinarily bounded by four streets, but some blocks are bounded by only three or less, or may be irregular in form. In some cases, imaginary bounds must be set for the block, conforming to prevailing block sizes.
3. **Census tract** — useful as a large unit for planning and operating a program. (Some rat control projects use zones, wards, elementary school, or health districts for this purpose.)
4. **Target area** — the operational territory of the program. Large cities may have several target areas operated as separate units. Other target areas may be designated for operation at a future date.
5. **City or county** — the largest unit, if the project has been activated throughout the city or county. Some projects perform services on a complaint basis throughout the city or county. Evaluation surveys, however, are ordinarily confined to the operational target areas, except for the inspection of fringe areas, where conditions may be compared to those in operational areas.

The *premises* is the basic unit for reporting infestation rates and for evaluating environmental deficiencies. It is also the unit for reporting rat killing, informational contacts, and enforcement activities.

The *block* is a convenient unit for defining progress, as rat-free blocks can be shown graphically on maps and listed in tabular reports. Baiting and other activities are carried out on all infested premises in a city block, and the reports filed according to block number. A block is reported as infested as long as any *active rat signs exist on a single premises*.

SAMPLE VS. COMPREHENSIVE SURVEYS

The *sample survey* entails the inspection of a randomly selected *sample* of the premises in the proposed or actual target area. The survey is used to

determine the need for a rat control program, or to evaluate the progress made by an operating program. The method described in this manual for making a sample survey is *not* designed for city-wide application. It is, rather, intended for use in the usual, more realistic situation whereby potential target areas are identified prior to making a baseline survey. Potential target areas are generally identified through existing knowledge as to the location of rat complaints, ratbites, deteriorating housing, and related indicators. In certain instances, it may be deemed necessary (given a widely dispersed infestation or many pockets of infestation throughout a community), as well as appropriate from a current and future resource standpoint, to undertake a city-wide sample survey. If so, statistical advice should be sought so that the city-wide sample survey can be designed in accordance with local conditions.

A comprehensive survey involves the inspection of all premises in the target area. This type of survey requires much more manpower than does a representative sample survey. Comprehensive surveys, if necessary, are usually made during the operational phase of a program and are tied in with public education, rat killing and code enforcement activities, as well as with neighborhood cleanups.

PERSONNEL REQUIREMENTS

Urban rat surveys are made by two-man teams, with the most qualified person recording the data and making decisions concerning field findings. The other person makes contacts with residents and helps with the inspection. Team leaders for sample surveys are usually experienced rodent control specialists or other competent personnel. Most comprehensive surveys are made by well-trained personnel under adequate supervision. One supervisor can work with three or four teams, providing guidance and transportation.

At least three to five days of classroom and field training are required for inspectors in order that their findings may be valid and their reporting comparable.

A good team should inspect the exterior of 90 to 110 premises per day in areas of multiple housing, small lots and alleys. In this case, the time spent in public contacts can be kept to a minimum. However, at the other end of the scale, only 50 to 60 premises may be inspected per team-day in areas with large lots, no alleys and inaccessible backyards. In this type of neighborhood, permission for entry to the

premises must be obtained prior to inspection as the people are accustomed to privacy and resent intrusion into their properties unless they understand the purpose of the inspections.

SURVEY PROCEDURES

The urban rat survey requires:

1. **Preparation** — planning the operation, recruiting and training staff, and organizing for effective supervision. Provisions should be made for arm bands, identification cards or buttons, or distinctive uniforms to identify personnel employed in the program.
2. **Notification** — using the various news media and personal visits to inform the public in advance about the survey and its importance to their city.
3. **Inspection** — inspecting the premises in residential areas and recording data on the survey form.
4. **Analysis** — tabulating survey findings, analyzing the data, taking photographs to illustrate the report and preparing a report with recommendations supported by tables, graphs, and maps.

SAMPLE SURVEY METHODOLOGY

A map, survey forms, and a complete list of blocks or premises are the major materials required to initiate a sample survey. Whether premises or blocks are listed, each unit must be clearly defined and given a number so that it can be unambiguously identified on the map. Due to expected variations in "block" configurations, a decision must be reached as to what constitutes a block for survey purposes, and all field personnel must be made aware of the definition.

The simplest and usually most desirable method for selecting the sample to be surveyed involves surveying *all* premises in a randomly selected number of blocks. The procedure for this is as follows:

1. Determine as closely as possible the number of blocks and the number of premises within the area(s) to be surveyed.
2. The number of premises which will have to be inspected in order to insure accurate results is then obtained from the table below:

If the target area(s) contain	Minimum number of premises will have to be
10,000 or more premises	500
Between 3,000 and 10,000 premises	450
Less than 3,000 premises	435

NOTE: It is vitally important that sample sizes adhere to these minimum standards, because reliability of the survey results depends upon them.

3. Divide the number of blocks in the entire target area(s) into the estimated number of premises.

$$\text{Example: } \frac{20,000 \text{ premises}}{1,000 \text{ blocks}} = 20 \text{ premises per block}$$

This figure represents the average number of premises per block in the target area(s).

4. Determine the number of blocks to be selected so that a sufficient number of premises (as obtained from the table above) will be surveyed.

Example: If it has been determined that it will be necessary to inspect at least 500 premises, and your target area(s) contain an average of 20 premises per block, then 25 blocks will have to be completely surveyed.

$$\frac{500 \text{ premises needed}}{20 \text{ (average premises per block)}} = 25 \text{ blocks}$$

5. Select the 25 blocks by using a table of random numbers, each number representing a specific, numbered block. A table along with directions for its use appears in the appendix.
6. It is very important, using this method, that *every* premises on a selected block be inspected, where at all possible, even if this requires repeat visits to the block.

Another, usually more difficult method for selecting sample premises, involves randomly choosing the required number of premises directly from a complete list of premises in the target area(s).

It is usually difficult to obtain a complete listing of premises. Moreover, the method calls for the arduous task of assigning each and every premises a number, along with identifying each one on a map.

SURVEY CREWS AND EQUIPMENT

Block surveys are made by two-man teams in order to facilitate contacts with householders while inspecting the premises in a minimum amount of time. Each team should carry lead pencils, a clipboard and a supply of the form, "Block Record - Exterior Sanitation and Rat Survey". It may be desirable to carry a flashlight and dog repellent. If a recording code is to be used, a copy should be taped to the clipboard for easy reference. Survey teams often distribute educational pamphlets while making surveys, in order to inform householders about the program objectives. The supervisor directs the survey and checks all completed block forms for accuracy.

PREMISES INSPECTION

Before leaving the office, the foreman assigns the blocks for his teams to inspect and makes certain that each team has the necessary supplies. To avoid delays, teams are assigned several blocks, and are taken to the first block to be inspected. The foreman must remain in the immediate area in order to contact his men frequently, to evaluate their work, and to give them encouragement and support when needed. His assistance may be needed to obtain permission to enter premises where the inspectors have been refused entry.

It is good practice for the supervisor to fill out the upper portion of the inspection form in the office prior to making assignments. The exact location of a block is indicated by writing the names of the streets that bound the block in the small block diagram on the upper left portion of the form. An assignment chart kept in the office keeps the supervisory staff informed of the locations of the teams and their daily progress.

It is best to standardize the corner of the block where the inspection will be started. From this corner, the inspectors proceed clockwise around the block, inspecting each premises in order. The two men of a team may work together on an inspection, or if both are well experienced, they may inspect alternate premises and yet be available to furnish assistance to each other.

Each premises is approached from the front or back sidewalk, and is not usually entered by crossing yards. The inspector goes directly to the door where he contacts a responsible adult to obtain permission for the inspection. He may hand the householder a brochure explaining the program, which will supplement his brief explanation of the program and its purpose. Usually only two or three minutes are required to communicate effectively with householders. In many cases the occupant will want to join in surveying the premises and this should be encouraged. It offers the inspector an opportunity to praise him for the good aspects of the premises, such as a clean yard, and to call attention to rat signs or other sanitation deficiencies.

The inspector should be business-like, courteous, friendly, and helpful to occupants. This will enhance the reputation of the department he serves. In some areas, especially in apartment districts, personal contacts may be kept to a minimum and premises can be entered either from the sidewalk or from the alley. This is particularly true when inspectors wear distinctive uniforms or large buttons to establish their identity with the program.

After receiving permission to inspect, the team proceeds around the yard, observing deficiencies and recording them on the survey form. Rat signs must be observed at close range in order to determine that a premises is *currently* infested. (Rat signs are discussed in detail in the guide, "Control of Domestic Rats and Mice".) In particular, inspectors should look for active rat runs or burrows in the yard, rat entries into buildings, burrows under walls or in ditch banks, fresh rat damage, rat feces in outbuildings, and other evidences of current rat infestation.

Under special circumstances, such as an investigation of a ratbite, inspectors, after securing permission, enter buildings to determine if there are interior infestations (the term "interior infestations" is applied only to main buildings and not to sheds or other outbuildings). The inspector may check all rooms for rat signs, but should remember that kitchens, closets, bathrooms, and basements are especially attractive to rats. The residents are often very helpful in providing information on a rat infestation, although they may confuse rats with mice.

In some communities, the interior rat population may be independent of, and may constitute a greater problem than the exterior population. If this situation does exist, surveys should be made to

provide information on the extent of interior infestation. Progress should be made in reducing it, along with progress toward eliminating rat entries.

Before leaving each premises, the inspector checks his form to make certain that all items have been completed. There will be instances where people will refuse permission to inspect. These refusals should be noted on the report form, and the cases referred to the foreman for further action. In other instances, there will be no responsible adult at home to grant permission for inspection. In such cases, whether to make an inspection then, or wait until a later date, is determined by the policy of the department.

INSTRUCTIONS FOR COMPLETING THE BLOCK RECORD FORM

The form, "Block Record - Exterior Sanitation and Rat Survey", (Figure 1) is used for recording premises information and deficiencies in sanitation for each premises in a city block. Although the form has spaces for only 16 premises, two or more forms can be used if a larger sample of premises is desired, entering the page number at the top of the sheet, such as "page 1 of 2".

Completed block records (Figure 1) should be checked and initialed by the field supervisors before they are turned in to the reports clerk for tabulation and filing. The clerk totals all columns on each block survey form and enters each block total on a single line of the "Summary - Exterior Sanitation and Rat Survey" (Figure 2). The summary form is used in evaluating progress and preparing maps, and for quarterly reports.

PREMISES ADDRESS

As the inspector proceeds clockwise around the block each street address is written in the left column. A vacant lot is entered as "Vacant Lot" with no street number assigned (Figure 1). While writing in the addresses, other data may be entered on the form, such as the number of dwelling units, rat infestations, and causative conditions noted in the front yard.

PREMISES INFORMATION

Column 1 - Residential. Each premises must fall into one of four categories: "Residential", "Business and Residential", "Business", or "Vacant Lot". A home, even a converted store

being used only as housing, is indicated by checking the "Residential" column.

Column 2 - Business and Residential. If a premises is used for both business and residential purposes (either in a single building, or in more than one building on a single lot), this column is checked (✓).

Column 3 - Business. This column is checked if the premises is used only for business purposes, or for other non-residential purposes, such as a church, clubhouse, or school. The type of premises, such as "School" may be written in the address column also. Some programs may wish to use a code for recording public properties, clubs, or churches.

Column 4 - Vacant Lot. A lot with no structure on it, other than possibly a shed, or the remains of a demolished house, is entered by checking this column. A commercial parking lot would, however, be checked in Column 3 as a business.

NOTE: Only one of the first four columns should be checked.

Column 5 - Food Business. If food is processed, stored, or regularly served or dispensed on a premises, both this column and Column 3 or 2 are checked.

Column 6 - Vacant. A check in this column indicates that the main building on the premises is not in use. This applies whether or not the building is temporarily vacant, or is boarded up and scheduled for demolition.

Column 7 - Dwelling Units. The number of mailboxes, meters, or doorbells may be counted, or an inquiry made of an occupant may be used to determine the number of dwelling units in a premises. The premises may have more than one occupied building on a single lot. The number of dwelling units is recorded in Column 7 for residential and combined business and residential properties. If the residence is vacant and should be demolished, place an "X" in this column as it has no usable dwelling units.

Figure 1

For Training Purposes Only

City DIXONCounty TILLER

BLOCK RECORD – EXTERIOR SANITATION AND RAT SURVEY

Date 5-1-71Inspector(s) JOHNSON - LEWISPage 1 of 1Census Tract 117Block No. 60

	Premises Address	Premises Information						Rat Food			Rat Harborage								Active Rat Signs			Potential Rat Entries	
		Residential	Business and Residential	Business	Vacant Lot	Food Business	Vacant	Dwelling Units	Unapproved Refuse Storage	Exposed Garbage	Animal Food	Abandoned Automobiles	Abandoned Appliances	Lumber on Ground	Other Large Rubbish	Outbuildings	Board Fences and Walls	Weeds and Grass	Exterior	Interior	Sewers on Premises	Structural	Sewers on Premises
1.	1201 NORTH AVE	✓						4	✓	✓		✓	✓	✓	✓	✓	✓		✓			✓	
2.	VACANT LOT				✓			0				*✓						✓	✓				
3.	1221 NORTH AVE	✓						4	✓				✓			✓							
4.	1243 " "			✓			✓	0	✓					✓		✓	✓					✓	
5.	1261 " "			✓		✓		0	✓	✓			✓		✓		✓		✓				
6.	1287 " "	✓						16	✓	✓	✓			✓	✓				✓		✓	✓	✓
7.	646 EAST ST.	✓						2	✓		✓		✓		✓					✓			
8.	660 " "	✓						2	✓														
9.	1296 SOUTH AVE		✓			✓		2						✓									
10.	1270 " "	✓						4	✓	✓		✓	✓									✓	
11.	1240 " "	✓						4	✓	✓	✓			✓	✓		✓					✓	
12.	1222 " "	✓						4	✓													✓	
13.	1218 " "	✓					✓	X										✓	✓			✓	
14.	1206 " "	✓						4	✓	✓	✓	✓	✓		✓		✓	✓	✓			✓	✓
15.	661 WEST ST.	✓						1	✓					✓	✓			✓	✓			✓	
16.	633 " "	✓					✓	2				✓	✓	✓	✓			✓	✓			✓	
Totals		12	1	2	1	2	3	49	12	5	4	5	7	7	8	3	5	5	8	1	1	10	2

* 6 ABANDONED AUTOMOBILES ON LOT

1X

SUMMARY – EXTERIOR SANITATION AND RAT SURVEY

Number of Premises with Deficiencies

City Dixon

County Tiller

Date 7-17-71

Clerk Littig

Census Tract 117

[illegible]

Total
%

RAT FOOD

These three columns are of the utmost importance, for rats must be denied food in order to make *permanent* rat control possible.

Proper refuse storage is possible only through use of containers of adequate construction, size, and number. In carrying out rat surveys, the following nationally accepted public health standards for refuse storage are recommended.

1. Approved Refuse Storage

- a. Refuse cans should be (1) water-tight; (2) provided with tight-fitting lids; (3) rust resistant; (4) structurally strong; (5) easily fitted, emptied and cleaned; (6) 5-32 gallons in size; (7) furnished with side handles or bail.
 - b. Galvanized metal or heavy plastic containers meet the guidelines under a. above.
 - c. Cardboard boxes used for yard trash and regularly collected are acceptable.
 - d. Plastic or moisture-resistant paper bags used for household refuse, properly tied and intact, placed at the curb or alley for household refuse on collection day are acceptable.
2. Plastic refuse bags are widely and increasingly used as liners in standard 20-gallon refuse containers, required by many building managers for refuse placed in bulk containers and used by many residents for yard trash. Caution should be observed in assessing unapproved refuse storage deficiencies when securely tied and intact plastic bags are observed at the official storage site for collection. In making your judgment on properly managed bags, you should:

- a. Be completely familiar with scheduled refuse collection days in the block being surveyed.
- b. Observe whether the storage site contains both standard refuse containers plus bags or whether plastic bags appear to be the sole containers for storing household refuse.

They are not approved for overnight storage outdoors when nocturnally active rats or other animals can easily gain access to them. They are acceptable when placed outside for collection the same day.

Column 1 – Unapproved Refuse Storage

Check this column if any household garbage, rubbish, or other refuse is not stored in approved containers with tight-fitting lids. Approved containers may be of a size between 20 and 32 gallons or they may be large, modern, metal, bulk containers. Metal or high-grade plastic containers are acceptable. Yard trash and other inedible materials, when properly placed in plastic or paper bags, securely tied and regularly collected, are approved. Yard trash, when placed in cardboard boxes and regularly collected, is *acceptable*.

Check this column if any of the following conditions are observed:

- a. Container not reasonably rat-tight and fly-tight.
- b. A 55-gallon drum.
- c. A non-standard metal or cardboard container except when regularly collected and used for yard trash only.
- d. A bin or stationary receptacle for the storage of refuse.
- e. Insufficient in size or number for the amount of refuse.
- f. Overflowing, or the cover is off the receptacle.
- g. On a platform on the ground, or with a shallow space, offering harborage to rats and possibly hiding scraps of food spilled from the container.
- h. Refuse has been burned, or
- i. Refuse is scattered (including garbage and rubbish, such as cans and bottles).

At some projects, more precise information is obtained by using symbols, instead of a check mark, for recording deficiencies, as illustrated in Figure 3. These symbols are:

- C – Refuse container is not rat-tight and reasonably fly-tight because of damage to can or cover. Household refuse in plastic or water-resistant paper bags, properly placed at the curb or alley on the day of collection is acceptable.
- U – Refuse container is not rat-tight or reasonably fly-tight because of improper *utilization* such as over-filling or leaving the cover off.
- D – 55-gallon *drums*, or smaller metal or cardboard drums.

Figure 3

For Training Purposes Only

City PIXONCounty TILLERDate 5-1-71Inspector(s) JOHNSON - LEWISPage 1 of 1Census Tract 117Block No. 60

BLOCK RECORD - EXTERIOR SANITATION AND RAT SURVEY

<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div>WEST ST.</div><div></div><div>SOUTH AVE</div></div><div><div></div><div></div><div>EAST ST.</div></div><div><div></div><div></div><div>NORTH AVE</div></div></div></div> <div>Premises Address</div>		Premises Information					Rat Food			Rat Harborage							Active Rat Signs			Potential Rat Entries		
		Residential	Business and Residential	Business	Vacant Lot	Food Business	Vacant	Dwelling Units	Unapproved Refuse Storage	Exposed Garbage	Animal Food	Abandoned Automobiles	Abandoned Appliances	Lumber on Ground	Other Large Rubbish	Outbuildings	Board Fences and Walls	Weeds and Grass	Exterior	Interior	Sewers on Premises	Structural
1. 1201 NORTH AVE	✓						4	CS	✓		1	6	3	5	✓	✓	✓	✓			✓	
2. VACANT LOT				✓			0				6						✓		✓			
3. 1221 NORTH AVE	✓						4	CS				1			✓							
4. 1243 " "			✓				0	U					1		✓	✓					✓	
5. 1261 " "			✓				0	CB	✓			1		1		✓		✓				
6. 1287 " "	✓						16	RB	✓	✓			1	1					✓		✓	✓
7. 646 EAST ST.	✓						2	DS		✓	3			1						✓		
8. 660 " "	✓						2	U														
9. 1296 SOUTH AVE		✓				✓	2						1									
10. 1270 " "	✓						4	C			2	8									✓	
11. 1240 " "	✓						4	CB	✓	✓			1	8		✓					✓	
12. 1222 " "	✓						4	CS													✓	
13. 1218 " "	✓					✓	x										✓				✓	
14. 1206 " "	✓						4	CB	✓	✓	1	3		2		✓	✓	✓			✓	✓
15. 661 WEST ST	✓						1	C					1	1		✓	✓	✓			✓	
16. 633 " "	✓					✓	2				1	1	1	1		✓	✓	✓			✓	
Totals	12	1	2	1	2	3	49	12	5	4	5	7	7	8	3	5	5	8	1	1	10	2

Remarks:

1x 9C 10 11 23 9 20
 24 12
 55 1P
 2N 4B

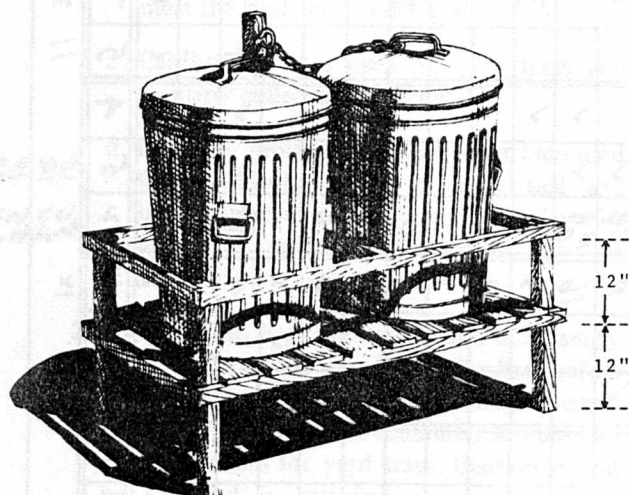
B — Refuse being *burned*.

R — Bins or other stationary *receptacles* in use for refuse storage.

S — *Scattered* small refuse which should be in approved refuse containers. This includes bottles, cans, and package materials which formerly contained food or drink. *Do not* report these small items under "Other Large Rubbish".

N — Insufficient *number* or size of containers.

P — *Platform* under refuse containers, with a shallow space offering harborage to rats and possibly hiding scraps of food spilled from refuse containers.



Column 2 — Exposed Garbage

Check this column if the observed refuse storage practices make garbage available to rats. There are many cases where *rubbish* items and other factors cause the premises to be checked for "Unapproved Refuse Storage", but *garbage* may not be available to rats. The following conditions are designated as exposed garbage:

- a. Garbage container is not rat-tight (space between container and lid is greater than $\frac{1}{2}$ inch and is used for the storage of garbage).
- b. Open refuse containers have garbage available to rats.

- c. Garbage scattered on the ground is available to rats or if plastic bags containing household refuse, particularly garbage, are ripped, are not properly tied, or obviously have been lying uncollected for more than one day. Beer cans, soft drink bottles and *old* food cans and jars do not constitute rat food. Note — Growing vegetables and fruits are *not* to be recorded as "Exposed Garbage". Any premises marked for "Exposed Garbage" should also be marked for "Unapproved Refuse Storage".

Column 3 — Animal Food

Check if uneaten animal food is exposed outdoors or is in an outbuilding accessible to rats. In the case of dog pens, check only if uneaten food is present. Garbage is not recorded as animal food, but only in the columns for unapproved refuse storage and exposed garbage.

RAT HARBORAGE

There are seven survey items in this section which are important in providing harborage to rats. A check in any column is made *only* if, in the judgment of the inspector, a significant rat harborage condition is evident. On some surveys, it may be desirable to quantify the harborage present by using figures to indicate the number of abandoned vehicles and appliances, and the number of cubic yards of other large rubbish and lumber on the ground. This would be helpful in (1) estimating quantities to be handled during cleanups, and (2) measuring progress in reducing the amount of harborage present.

Column 1 — Abandoned Vehicles

Check this column if vehicles are in the yard or in the adjoining street or alley. If the number of vehicles is desired, enter the number instead of a check mark. A vehicle is considered to be abandoned if the license tag is not current, if major parts are missing, or if high grass and weeds are growing around it. Abandoned vehicles observed in rat-accessible garages are also recorded by a check or a number. The total at the bottom of the form represents the number of *premises* with abandoned vehicles. The total number of vehicles may be entered below as in Figure 3.

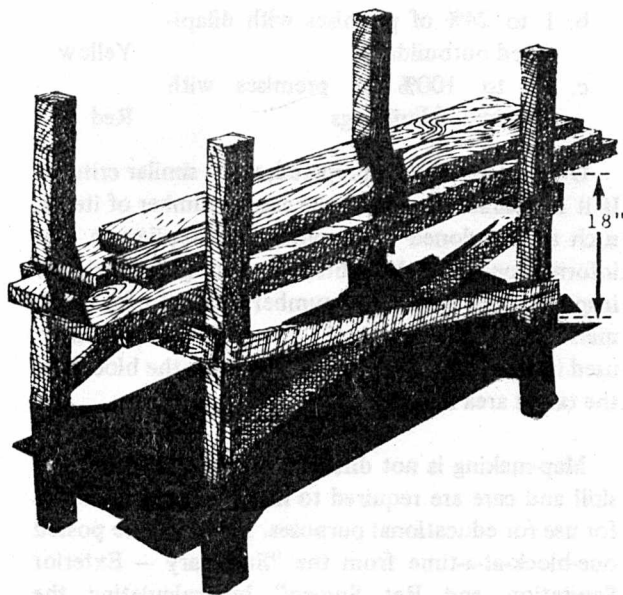
Column 2 — Abandoned Appliances

Check this column if appliances (such as a refrigerator, stove, or washing machine) are stored in the yard or in a dilapidated outbuilding. As with

automobiles, only one check mark is made despite the number of items. The survey ordinarily shows the number of premises with these deficiencies, not the number of cars or appliances. The number of appliances may be entered in the column instead of using a check mark. However, total the premises with abandoned appliances at the bottom of the form, and total the number of appliances below as in Figure 3.

Column 3 – Lumber on Ground

Check this column if a significant amount of lumber or firewood (covering one square yard or more) is not stacked at least 12 inches off the ground. Do not record a few scattered pieces of lumber. Lumber left on the ground as a result of recent building construction or demolition and subject to early removal is not reported as a deficiency. If the amount is to be quantified, estimate the number of cubic yards to the nearest whole number.



Column 4 – Other Large Rubbish

Check this column if there are other discarded items of rubbish which are too large or otherwise not suitable for storage in approved refuse containers and which would provide good harborage for rats. This includes tires, large cans and drums, tree limbs, rubble, furniture, doors, and other large items not listed in other columns. If the amount is to be quantified, estimate the number of cubic yards to the nearest whole number.

Column 5 – Outbuildings

Check this column only if buildings are dilapidated, or otherwise provide significant rat harborage. A tight, well-maintained building or open shed would not be reported. Appliances, lumber or large rubbish in an open shed would be reported if they furnish harborage.

Column 6 – Board Fences and Walls

Check this column if dilapidated board fences or walls furnish harborage for rats.

Column 7 – Weeds and Grass

Check this column if weeds or grass are more than 12 inches high and sufficiently thick to hide refuse and provide cover for rats. Brush and unkempt shrubbery that furnish temporary rat harborage are deficiencies.

ACTIVE RAT SIGNS

Column 1 – Exterior and/or Interior

Check these columns if fresh rat signs are observed during the exterior or interior inspection. Active rat signs usually will be one or more of the following:

1. Rat burrows – active burrows (without cobwebs or other blockage);
2. Rat tracks – fresh foot tracks or tail marks;
3. Feces – fresh feces are dark and soft; old feces are hard or gray and brittle;
4. Gnawing – if fresh;
5. Live or dead rat – positive evidence if alive or if carcass is not old and desiccated;
6. Rat runs – those currently well traveled (rat runs usually lead to food sources, water and harborage);
7. Rub marks – if fresh they are black, soft, and greasy; and
8. Rat hairs, which are often found on rub marks at entries to houses.

Column 2 – Sewers on Premises

The purpose of this column is to obtain data useful for evaluating the importance of sewer infestations. Check this column if there are active signs which indicate that rats are traveling between the premises sewer system and exterior portions of the premises. *Positive* evidence could be active

burrows located near catch basins or broken sewer pipes, or fresh rub marks on broken downspouts. If Column 2 is checked, Column 1 will *always be checked* also as this is another exterior rat sign.

POTENTIAL RAT ENTRIES

The two columns in this section are designed for recording the need for rat stoppage work to prevent rats from entering structures, and for rat stoppage work needed to prevent rats living or traveling in sewers from gaining access to the exterior of premises.

Column 1 – Structural

Check this column if there is an actual or potential rat entry to the home within four feet of the ground or other low horizontal surfaces. If the rat entry is *definitely* active, put a check in the "Exterior Rat Signs" column also.

Column 2 – Sewers on Premises

Check this column if there are holes, or breaks, in sewer pipes or storm water drains which could permit a rat to travel between the yard and the sewer system, but there are not active sewer rat signs.

REMARKS

This space, and the back of the form, may be used for explaining items checked above, or for furnishing additional data concerning important deficiencies.

MAPPING

An attractive wall map of the city or target area should be appropriately marked to record program progress. The map is posted daily from the form "Summary – Exterior Sanitation and Rat Survey". The following criteria may be used for preparing maps:

MAPS OF MAJOR DEFICIENCIES

	Color
Map of Rat Infestation	
a. 0 to 2% of premises infested	Blue
b. 3 to 6% of premises infested	Yellow
c. 7 to 25% of premises infested	Green
d. 26 to 100% of premises infested	Red

Map of Refuse Storage

a. 0 to 30% of premises deficient	Blue
b. 31 to 60% of premises deficient	Yellow
c. 61 to 100% of premises deficient	Red

Map of Exposed Garbage

a. 0 to 15% of premises deficient	Blue
b. 16 to 30% of premises deficient	Yellow
c. 31 to 100% of premises deficient	Red

Map of Abandoned Automobiles or Appliances

a. None in block	Blue
b. Less than 10% of premises with abandoned automobiles or appliances	Yellow
c. 10 to 100% of premises with abandoned automobiles or appliances	Red

Map of Dilapidated Outbuildings

a. None in block	Blue
b. 1 to 24% of premises with dilapidated outbuildings	Yellow
c. 25 to 100% of premises with dilapidated buildings	Red

Other maps may be prepared, using similar criteria. If it is desirable to know the actual number of items, such as abandoned automobiles and appliances, this information must be obtained during the original inspection by entering a number, instead of a check mark on the block record. These data may then be used in tabulations or entered as dots in the blocks on the target area map.

Map-making is not difficult, although considerable skill and care are required to make high-quality maps for use for educational purposes. The maps are posted one-block-at-a-time from the "Summary – Exterior Sanitation and Rat Survey" by calculating the percentages for each item, determining the correct color, and coloring the maps.

The map color for each block is determined by computing the premises index for each deficiency. The *premises index* for a block is computed as follows for the rat infestation map:

$$\text{No. of rat-infested premises in block} \times 100 / \text{Total premises in block} = \text{Premises index}$$

The premises index for a larger area, such as a census tract, zone, or target area is computed in the same way, as follows:

No. of rat-infested premises in area X 100 / Total number of premises inspected = Premises index

Entire census tracts, zones, elementary school districts, or wards may be used as units in preparing this map. Each relatively large area has a single color. In addition to being more attractive than a map with individual blocks colored, this map simplifies the discussion of problem *areas* rather than problem blocks.

The survey is an important means for providing

the entire project with information about the target areas and their challenging problems, and with a better understanding of the needs of people. The inspectors' duties provide them with unusual opportunities for expressing their genuine interests in the health and happiness of others.

This handbook was produced to serve as a basis for marking valid surveys and resurveys. Standardization is needed to provide data that are meaningful and comparable from year to year. However, the survey is only a framework for an activity which requires the devoted services of many people who derive satisfaction from improving their communities.

APPENDIX

Selecting a Random Sample

Suppose that we have a finite population from which we wish to draw random sample of N elements. A method of doing this would be to assign a number to each number of the population, put a set of numbered tags corresponding to the elements into a box, shake the box and then draw N tags from it. The numbers on these N tags would correspond to the elements to be selected. This method could be satisfactory but would require considerable labor in preparing the tags.

One can avoid preparing the numbered tags by use of a table of random numbers. Such a table consists of numbers chosen in a fashion similar to drawing numbered tags out of a box. This table is so made that all numbers 0, 1, ..., 9 appear with approximately the same frequency. By combining numbers in pairs we have the numbers from 00 to 99. By combining the numbers three at a time we have numbers from 000 to 999, etc. Table 1 is a table of random numbers which can be used to select a random sample. The starting point in the table should be selected randomly. One way is to close one's eyes and place a finger on a page of the table.

Suppose one wishes to select at random 20 blocks from a total population of 427 blocks in the area to be surveyed. First, assign the numbers 1 through 427 to the 427 blocks using a map of the area so that each block is clearly defined. Since 427 is a three-place

number, three columns in the table are combined and read together. If it were a two-place number, two columns in the table would be combined and read, if a four-place number four columns would be combined and read, etc. (A column is a single list of vertical numbers. In this table they are grouped in pairs.) Select a starting point on the table randomly. If the number at the starting point is 427 or less, select the block having that number. If the number of the starting point is greater, continue down the column until a number 427 or less is reached and select the block having that number. In either case, continue down the column and, if necessary, down the adjoining columns until 20 different numbers 427 or less have been located corresponding to the 20 blocks which are selected. Any number over 427 is ignored since there are only 427 blocks in the total population to be surveyed. If the same number 427 or less is encountered more than once, it does not matter. Continue until 20 different blocks are selected.

The following example, assuming 20 blocks to be chosen out of a total population of 427 blocks, illustrates the selection process. Suppose the randomly chosen starting point is the number formed by vertical columns 25, 26 and 27 in the 28th horizontal row of the 3rd page of random numbers (Page 18). This number is 724. Continuing down the column one comes to the number 081. The block designated as block 81 would be the first block chosen. Other blocks chosen would include 361, 373, 61, 164, 224, 118, 300, 9, 140, 38, 401, 225, 233, 328, 5, 184, 117, 376 and 114. The last 9 blocks chosen are found in the numbers formed by combining columns 28, 29 and 30 on the page.

TABLE 1 RANDOM NUMBERS

60 06 47	98 21 58	56 49 01	56 73 29	70 96 79	51 75 51	54 10 04
51 81 17	58 66 30	25 87 71	58 60 02	14 93 62	47 90 05	72 42 66
11 18 29	73 19 41	31 89 19	46 89 30	16 01 67	24 05 63	84 66 08
58 88 55	05 34 64	70 94 96	64 64 82	20 70 86	81 05 47	94 85 92
39 67 26	49 19 64	88 49 12	25 36 06	64 90 10	52 82 07	81 00 44
32 28 93	65 47 82	15 40 03	55 25 77	89 24 12	80 25 89	26 72 34
73 07 31	96 78 95	93 63 77	81 19 84	56 57 98	26 49 00	91 25 97
55 38 86	81 02 24	41 55 37	14 04 63	99 10 03	94 94 77	94 91 30
42 93 75	26 51 78	95 91 26	47 84 53	38 77 77	90 05 46	79 57 93
60 01 06	66 01 73	18 11 12	99 17 36	06 48 49	07 62 67	25 36 21
94 86 84	71 72 48	27 15 89	10 58 67	24 18 19	51 67 18	26 94 77
77 89 23	86 79 60	02 64 79	64 81 16	15 88 44	37 50 48	56 48 67
17 85 77	85 82 16	15 19 22	24 25 70	99 19 89	19 93 64	91 12 11
08 40 03	74 16 36	34 81 09	18 69 85	82 20 02	96 71 75	38 76 52
95 92 43	47 99 06	63 94 82	03 94 90	05 84 61	37 18 09	74 10 91
23 56 49	22 28 86	84 56 54	14 78 88	52 74 08	57 96 64	79 61 29
66 26 77	78 85 79	54 10 73	26 40 16	27 20 30	30 00 46	74 13 24
00 04 60	06 59 42	96 77 99	02 90 05	25 69 65	44 31 71	67 06 12
53 35 83	32 40 10	54 24 30	00 52 93	63 99 07	20 12 71	59 36 21
71 61 23	67 26 84	71 58 58	82 25 56	46 77 80	22 34 96	73 29 70
91 24 03	42 79 56	72 35 49	12 89 14	81 04 42	73 07 39	35 77 96
61 19 94	86 88 42	89 17 42	67 20 27	19 75 26	24 31 97	56 43 69
75 44 15	80 32 39	40 10 06	45 19 29	68 34 89	32 21 88	34 45 05
94 92 41	30 09 66	30 13 17	77 81 01	66 19 35	75 48 38	72 45 41
45 36 02	28 97 60	03 86 99	12 13 10	66 24 37	48 39 67	03 95 97
43 77 91	25 85 85	78 87 58	59 21 29	73 19 76	72 50 21	37 53 34
62 75 41	61 15 20	18 15 31	90 01 57	96 75 47	82 16 36	17 62 53
38 93 56	59 49 04	14 41 26	92 37 58	81 12 30	33 30 19	72 42 98
28 78 75	38 75 49	21 88 45	23 62 51	86 87 69	78 87 56	47 73 17
91 19 57	82 14 78	83 27 23	98 22 26	80 36 00	86 81 00	49 01 91
29 59 37	43 62 63	88 38 97	42 90 04	98 38 82	21 85 82	19 89 22
44 30 03	09 34 80	38 95 82	07 45 44	13 61 23	99 06 78	78 90 11
51 82 12	35 93 62	68 40 20	73 04 19	82 14 70	91 25 48	61 33 18
28 91 22	07 75 46	52 87 71	81 09 46	55 17 35	70 88 49	11 63 97
48 37 22	23 69 64	76 70 92	51 55 35	98 25 53	47 78 83	41 42 90
03 62 73	15 92 37	29 74 20	14 17 97	45 25 64	88 50 16	20 78 86
99 11 15	24 38 80	29 50 14	70 96 76	61 26 73	22 17 57	86 78 80
44 13 41	42 91 25	42 79 65	53 36 21	66 22 34	64 72 55	04 00 70
88 36 14	85 76 72	42 80 40	07 49 16	28 81 18	12 24 04	69 65 31
60 15 83	45 32 39	76 76 74	15 63 87	56 57 99	04 68 43	71 78 72
32 61 39	79 57 89	14 70 98	29 20 07	67 03 95	93 72 44	19 79 53
53 66 02	46 62 54	23 81 02	56 74 04	74 23 74	19 83 36	28 85 86
88 47 96	81 16 48	43 81 09	11 67 00	82 20 77	95 99 13	62 45 20
26 83 44	25 39 53	68 35 76	62 58 64	87 65 37	31 87 59	32 40 08
88 41 53	33 08 98	29 19 72	35 86 86	98 23 99	16 47 90	05 64 79
59 23 68	53 43 52	98 34 46	57 93 62	64 74 03	82 12 43	76 68 42
89 17 72	35 47 75	49 09 16	53 64 85	96 68 34	75 43 79	60 04 29
35 82 07	56 68 48	35 68 31	97 58 75	29 34 94	91 24 08	82 12 93

87 69 76	54 25 83	30 47 87	68 31 63	95 85 81	09 02 52	99 18 14
85 86 90	10 02 23	92 43 61	33 04 35	58 58 80	25 73 16	13 42 99
17 81 10	27 04 24	25 89 23	88 49 08	82 10 95	99 13 66	21 74 05
90 05 48	61 28 81	07 46 75	44 32 78	96 74 00	23 84 62	73 19 96
76 53 45	31 94 96	69 74 02	44 32 34	63 80 30	22 22 43	58 67 13
09 12 33	32 61 25	93 71 71	70 94 81	00 74 24	24 15 78	71 58 56
68 51 69	71 71 73	09 95 99	17 88 53	47 78 79	53 57 99	07 62 64
87 69 61	40 02 37	38 84 68	53 33 10	75 40 01	38 94 85	75 40 16
17 54 28	83 50 48	62 68 54	00 40 14	35 53 36	33 10 90	09 33 19
61 12 25	56 64 90	10 55 08	20 19 67	04 05 73	05 85 90	02 94 94
91 27 01	70 90 10	07 29 29	68 34 77	78 81 18	01 52 88	39 55 20
08 68 36	23 79 50	17 49 01	85 91 17	86 96 78	91 28 75	35 79 49
11 01 37	34 81 06	35 55 18	41 63 98	23 84 60	02 10 25	59 54 25
62 45 43	61 15 58	76 60 07	45 11 73	06 59 48	53 68 42	81 21 99
07 72 52	90 07 74	11 85 83	45 18 23	95 85 79	68 40 15	49 04 67
09 81 06	78 94 90	08 90 02	52 85 84	68 57 96	64 64 89	26 57 90
05 28 71	66 12 10	70 93 69	65 48 54	09 52 78	92 37 63	83 48 58
58 76 74	06 32 38	95 86 92	39 65 45	03 88 34	45 15 48	35 84 65
51 68 40	03 11 63	99 14 87	57 98 25	52 74 23	97 53 41	28 96 76
70 87 69	76 53 44	03 25 93	60 18 16	11 98 25	71 63 93	56 42 96
79 51 61	13 09 47	94 78 73	10 33 01	49 00 00	88 46 50	29 35 78
84 65 49	12 96 64	78 75 40	20 06 88	54 17 87	59 53 36	09 10 36
29 69 73	17 87 78	88 55 25	85 96 67	21 79 47	98 32 44	15 11 90
00 14 78	76 73 03	48 55 34	96 65 40	18 07 37	61 23 87	58 70 93
64 80 31	80 40 28	83 47 97	57 96 74	06 39 68	39 82 27	17 77 80
35 68 50	37 14 65	35 74 20	45 31 94	80 32 32	44 37 55	15 43 78
87 71 68	41 61 40	25 32 71	63 87 65	36 14 96	73 10 88	50 17 76
51 73 16	52 80 29	30 10 72	52 82 20	69 65 33	36 36 01	18 59 24
25 70 88	35 50 19	20 04 60	19 51 67	24 25 63	91 20 49	11 95 85
90 10 17	84 62 59	54 10 18	13 14 90	10 57 91	17 47 89	12 92 42
82 14 58	68 47 93	67 27 39	56 45 14	96 70 92	37 46 78	75 35 49
09 41 40	05 33 19	74 20 09	31 73 09	86 86 88	53 65 47	72 38 96
66 14 86	97 58 78	85 85 98	36 31 98	28 83 44	41 61 28	93 58 75
39 36 34	64 87 58	67 12 02	01 95 96	77 85 89	22 51 75	30 08 87
77 87 75	26 53 59	37 15 99	02 81 10	54 16 37	41 27 48	42 90 10
64 92 33	27 40 00	33 12 52	95 93 59	44 41 46	62 60 04	26 33 18
69 79 53	44 24 06	94 83 30	47 87 65	42 80 30	04 03 52	98 26 59
24 03 07	16 12 85	96 80 27	52 97 45	15 73 24	14 93 70	89 22 45
38 84 62	59 38 70	90 01 62	69 80 30	21 54 28	84 61 38	90 10 67
16 14 60	06 47 80	25 68 53	35 97 51	62 47 98	39 37 34	80 22 07
88 53 37	15 16 23	73 14 84	55 26 78	90 01 36	01 69 84	60 17 32
43 42 92	46 63 92	38 89 25	87 55 32	19 37 44	00 75 26	22 16 29
39 65 54	12 90 01	86 82 07	01 92 45	19 74 20	60 17 29	24 11 74
22 10 52	93 59 48	33 22 06	95 97 59	40 06 92	41 36 38	85 78 84
55 08 09	91 16 62	73 19 92	37 23 63	86 97 56	74 00 88	33 01 82
08 32 37	57 97 58	73 26 89	19 29 13	24 41 60	20 56 58	88 41 56
69 73 13	05 16 08	89 13 00	37 19 54	03 34 96	79 65 56	57 97 48
32 73 13	20 17 94	89 31 90	01 84 53	46 88 53	46 57 98	23 77 97

84 55 38	87 70 94	82 10 44	19 35 45	16 14 01	05 90 06	17 39 80
27 17 56	60 16 17	73 07 33	37 57 91	11 82 25	72 38 95	88 38 91
30 53 36	31 81 08	81 06 76	53 66 07	11 68 41	56 59 49	07 25 44
12 21 90	07 82 03	16 28 76	73 07 62	44 35 69	77 97 47	93 57 77
96 73 07	90 10 87	71 82 17	56 69 81	20 72 33	36 15 56	70 98 28
76 66 10	40 07 95	89 18 16	23 77 87	56 48 42	97 56 48	29 16 55
05 16 12	73 25 48	27 19 49	09 11 91	15 83 28	58 65 33	08 58 59
30 36 12	40 17 56	54 29 15	70 89 15	68 36 31	84 62 56	49 08 24
27 05 29	12 27 32	50 28 99	05 88 42	95 90 05	35 82 12	32 39 49
05 14 71	77 91 27	01 73 12	24 08 80	37 28 90	08 54 12	17 55 36
25 62 57	97 56 60	12 95 94	90 05 28	93 67 01	88 39 75	35 76 60
19 60 10	44 34 65	47 68 44	20 70 88	48 55 35	45 06 44	26 19 75
33 12 13	69 65 32	41 23 86	95 89 15	82 21 84	62 61 15	99 09 51
71 62 70	87 66 21	83 41 47	84 67 10	65 36 30	07 68 37	54 04 07
63 84 61	35 49 04	59 39 38	97 50 22	50 39 45	14 06 26	50 27 18
21 74 01	30 44 28	90 05 92	54 25 50	52 99 01	73 17 87	59 46 86
88 35 82	23 87 65	35 81 13	28 75 35	50 37 57	98 26 51	67 24 18
58 62 44	36 09 68	34 91 27	42 91 29	67 07 69	83 42 98	38 99 15
76 69 68	41 18 27	38 80 41	23 97 60	14 91 17	78 78 84	65 61 11
79 61 39	79 51 70	93 66 08	44 02 08	17 63 76	67 16 38	96 77 81
06 92 53	46 77 93	67 13 24	25 85 94	78 94 93	68 47 90	08 44 34
86 96 68	41 19 69	72 45 06	08 83 50	33 16 05	31 84 72	39 38 96
78 72 45	15 68 52	94 96 73	09 49 20	23 81 14	23 72 44	08 03 73
10 90 06	81 04 68	40 17 99	06 55 08	35 64 63	87 60 07	98 24 26
93 58 71	67 19 82	23 72 51	85 80 30	21 86 94	76 64 81	03 10 01
31 78 77	97 51 65	33 21 91	12 22 09	09 21 92	37 41 45	23 67 23
63 90 02	16 33 35	54 06 33	09 33 15	15 71 57	99 16 51	81 18 27
47 96 70	91 19 79	65 49 02	89 19 28	72 49 08	82 05 15	99 14 29
57 92 46	60 06 37	37 20 39	64 71 78	76 69 63	99 13 41	51 60 08
16 44 11	01 28 82	09 11 94	90 09 13	08 17 47	91 18 12	12 80 28
60 19 88	45 17 76	52 98 38	96 63 98	36 11 07	03 38 98	32 58 67
03 48 66	28 96 77	99 00 11	89 25 61	37 30 21	54 19 22	54 17 85
82 21 61	30 45 04	32 59 21	57 98 24	06 11 44	04 13 15	12 75 27
28 91 20	11 03 34	94 85 85	74 24 04	53 33 28	69 78 74	21 99 06
35 68 37	27 01 05	73 02 25	84 53 37	16 41 29	28 74 08	09 35 89
17 89 23	83 50 27	01 72 52	87 73 14	22 47 68	41 47 79	53 38 84
61 40 15	89 20 66	13 07 43	79 68 40	11 84 57	82 26 27	31 87 56
44 20 21	47 79 48	64 71 78	83 28 86	87 67 23	88 51 86	85 87 60
10 20 06	68 35 64	63 90 06	14 76 57	94 89 31	92 37 17	43 74 18
08 86 97	40 06 15	77 78 93	71 71 72	30 04 08	47 83 50	41 58 88
36 14 78	74 17 99	16 21 74	01 55 14	00 96 73	23 56 69	83 38 91
26 80 36	02 17 80	39 38 67	00 08 87	56 54 18	76 55 22	02 39 61
22 27 01	34 56 48	32 61 40	21 38 87	61 37 49	16 56 58	79 59 38
96 80 34	42 87 60	03 99 16	25 55 08	14 04 04	16 36 07	91 18 16
44 29 20	03 62 69	71 71 69	84 67 23	72 42 97	46 54 23	60 02 71
74 08 31	79 67 24	16 05 35	43 58 88	45 39 53	57 93 63	90 02 66
01 86 95	83 38 65	36 08 24	17 67 26	71 73 18	67 00 88	45 19 99
08 29 63	76 55 17	88 51 72	51 90 03	03 86 83	49 17 92	45 37 63

09 93 60	20 52 82	14 15 13	38 92 50	36 35 47	81 01 96	80 45 15
76 59 42	82 10 80	32 37 11	90 00 10	43 87 65	33 02 52	94 82 12
00 95 97	52 94 86	79 49 09	30 49 10	72 34 94	77 97 57	97 41 33
12 03 84	69 60 01	75 36 14	81 19 27	16 24 29	64 71 63	80 33 07
01 39 74	06 35 60	06 09 17	94 88 53	58 59 38	70 90 09	53 61 26
64 87 56	62 65 43	69 82 06	87 67 08	90 06 62	68 43 65	34 71 66
12 94 88	42 95 90	07 60 17	96 63 99	07 89 19	62 56 50	50 38 95
92 45 35	52 93 74	07 35 89	13 20 34	98 36 17	75 28 94	91 16 47
86 84 62	63 79 69	83 29 53	34 92 40	13 21 76	69 71 71	69 86 97
54 01 30	02 32 63	79 46 89	29 36 22	27 15 85	90 08 48	57 96 79
58 81 12	61 27 40	19 89 30	36 43 87	60 08 20	08 38 93	68 50 27
13 61 33	03 17 43	73 06 53	56 45 46	54 10 89	28 88 34	50 18 26
93 74 19	47 91 13	43 49 05	87 71 83	45 32 71	61 17 33	12 33 14
72 40 09	56 42 68	57 94 79	56 68 32	34 87 64	64 65 39	68 45 36
09 61 25	90 03 72	55 32 31	83 36 09	45 13 27	41 53 59	39 40 05
70 94 79	61 43 54	12 95 92	50 50 27	02 98 36	39 71 69	83 31 59
49 23 70	87 75 29	26 30 47	98 22 48	42 77 99	09 65 40	07 84 67
21 89 12	02 56 41	58 70 94	90 07 39	63 87 69	85 96 67	21 67 25
56 45 23	67 25 84	55 17 90	02 24 46	73 08 28	59 28 90	04 99 03
67 19 98	33 30 47	98 33 02	48 59 47	70 93 70	99 09 26	68 30 28
76 76 77	79 71 83	33 39 40	07 73 05	91 18 11	50 36 20	19 43 67
07 01 28	58 59 53	60 19 58	85 82 15	09 02 15	71 72 34	77 88 46
78 87 66	28 78 90	07 44 03	62 52 94	88 50 52	94 91 21	79 61 20
38 83 38	68 34 49	03 34 73	18 22 25	68 47 99	13 61 18	17 49 02
22 02 68	34 87 72	34 79 57	75 48 29	26 29 62	73 15 35	68 51 79
50 38 91	20 34 70	96 64 64	85 76 53	67 24 21	73 22 52	84 64 62
51 84 53	55 34 49	05 23 92	45 07 83	34 63 97	42 90 03	35 46 49
04 83 41	46 61 42	86 78 79	64 65 34	85 97 47	84 52 84	67 18 18
66 31 58	71 80 31	95 92 50	22 59 43	50 38 66	27 47 96	73 07 11
40 08 17	85 88 33	01 63 78	80 38 76	56 75 25	92 39 58	84 54 06
14 11 47	92 47 93	73 03 12	51 59 49	01 63 86	91 13 03	64 82 11
66 06 95	84 57 93	67 05 68	44 27 36	04 45 03	75 39 48	37 55 32
60 04 39	40 01 67	16 21 37	61 30 20	74 22 28	86 98 24	09 94 77
94 95 97	48 34 43	75 39 57	96 68 35	80 38 65	60 16 02	08 11 80
33 16 28	79 52 99	08 34 43	56 75 41	51 83 28	93 66 02	82 09 30
44 05 05	84 59 31	59 32 46	49 07 22	43 80 38	86 91 32	42 90 04
13 10 55	40 20 56	43 78 87	60 07 17	30 05 22	15 59 26	73 09 12
51 87 62	62 49 22	42 84 64	68 38 98	24 44 00	67 00 40	12 59 44
13 64 89	23 99 04	48 27 40	21 97 55	22 60 12	43 84 60	03 10 62
53 67 17	92 46 62	61 23 54	01 95 96	68 47 95	98 36 00	66 11 53
54 00 28	87 58 70	97 51 81	18 27 33	10 48 27	49 01 92	51 53 46
64 84 61	43 73 21	99 19 53	64 80 42	68 51 65	35 62 74	17 35 47
83 37 33	08 57 89	22 01 38	77 83 45	39 48 62	46 74 05	91 13 62
47 90 01	85 81 17	63 96 67	16 05 40	14 74 19	27 00 45	46 87 70
91 24 07	68 56 47	68 54 01	88 42 88	49 06 98	38 93 68	51 80 38
96 64 66	03 55 20	36 16 47	90 01 76	75 50 42	89 26 73	24 00 19
25 50 48	39 60 07	92 38 85	79 70 90	06 85 83	29 53 41	61 12 71
70 94 87	59 24 03	33 15 84	51 71 59	25 76 76	53 46 86	99 05 52

95	97	43	49	15	65	41	28	73	09	13	22	04	17	31	77	93	71	61	30	38
79	61	20	28	58	58	86	99	06	53	40	14	61	26	25	93	68	35	80	42	99
17	87	63	85	75	24	21	89	19	71	80	40	09	50	39	79	55	10	90	03	09
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